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AMERICAN NATIONAL STANDARD ANSI/ASTM A 325 – 79

American Association
State Highway and
Transportation Officials
Standard AASHTO No.: M 164

Standard Specification for HIGH-STRENGTH BOLTS FOR STRUCTURAL STEEL JOINTS[1]

This standard is issued under the fixed designation A 325; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval.

This specification has been approved for use by agencies of the Department of Defense and for listing in the DOD Index of Specifications and Standards.

1. Scope

1.1 This specification[2] covers the chemical and mechanical requirements of various types of quenched and tempered steel bolts commonly known as "high-strength structural bolts," intended for use in structural joints that are covered under requirements of the Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts,[3] issued by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation. The various types of bolts covered in this specification are:

1.1.1 *Type 1*—Bolts made of medium-carbon steel, supplied in sizes 1/2 to 1 1/2 in., inclusive, in diameter.

1.1.2 *Type 2*—Bolts made from what is generally described as low-carbon martensite steel, supplied in sizes 1/2 to 1 1/2 in., inclusive, in diameter.

1.1.3 *Type 3*—Bolts, 1/2 to 1 1/2 in., inclusive, in diameter having atmospheric corrosion resistance and weathering characteristics comparable to that of the steels covered in Specification A 588, Specification A 242, and Specification A 709 (these steels have atmospheric corrosion resistance approximately two times that of carbon structural steel with copper).

1.2 When the bolt type is not specified, either Type 1 or Type 2 may be supplied at the option of the manufacturer. Type 3 bolts may be supplied by the manufacturer if agreed by the purchaser. Where elevated temperature applications are involved, Type 1 bolts shall be specified by the purchaser on the order.

1.3 When atmospheric corrosion resistance is required, Type 3 bolts shall be specified by the purchaser in any inquiry or order.

NOTE 1—Bolts for general applications, including anchor bolts, are covered by ASTM Specification A 449, for Quenched and Tempered Steel Bolts and Studs.[4] Also refer to Specification A 449 for quenched and tempered steel bolts and studs with diameters greater than 1 1/2 in., but with similar mechanical properties.

1.4 This specification provides that heavy hex structural bolts shall be furnished unless other dimensional requirements are stipulated in the purchase inquiry and order.

1.5 **When galvanized high-strength structural bolts are specified, the bolts shall be either Type 1 or 2, at the manufacturer's option, unless otherwise ordered by the purchaser. Bolts shall be hot-dip galvanized, or, with the approval of the purchaser, bolts may be mechanically galvanized. Galvanized bolts and nuts shall be shipped in the same container.**

1.6 Suitable nuts are covered in Specification A 563. Unless otherwise specified, nuts shall be heavy hex, and the grade and surface finish of nut for each type of bolt shall be as follows:

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[1] This specification is under the jurisdiction of ASTM Committee F-16 on Fasteners, and is the direct responsibility of Subcommittee F16.02 on Steel Bolts, Nuts, Rivets, and Washers.

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[2] For ASME Boiler and Pressure Vessel Code applications see related Specification SA-325 in Section II of that Code.

[3] Published by American Institute of Steel Construction, New York, N. Y.

[4] *Annual Book of ASTM Standards,* Part 4.

Bolt Type	Nut Grade and Finish
1 and 2, plain (noncoated)	C, plain
1 and 2, galvanized	DH, galvanized
3	C3

1.6.1 Grades 2 and 2H nuts, as specified in Specification A 194, and Grades D and DH nuts, as specified in Specification A 563, are acceptable alternatives for Grade C nuts. Grade 2H nuts, as specified in Specification A 194, are acceptable alternatives for Grade DH nuts. Type DH3 nuts are acceptable alternatives for C3 nuts.

1.7 Suitable hardened washers are covered in Specification F 436. Unless otherwise specified, galvanized washers shall be furnished when galvanized bolts are specified, and Type 3 weathering steel washers shall be furnished when Type 3 bolts are specified.

NOTE 2—A complete metric companion to Specification A 325 has been developed—Specification A 325M; therefore no metric equivalents are presented in this specification.

2. Applicable Documents

2.1 *ASTM Standards:*

A 153 Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware[5]

A 194 Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service[6]

A 242 Specification for High-Strength Low-Alloy Structural Steel[4]

A 370 Methods and Definitions for Mechanical Testing of Steel Products[7]

A 490 Specification for Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints[4]

A 563 Specification for Carbon and Alloy Steel Nuts[4,6]

A 588 Specification for High-Strength Low-Alloy Structural Steel with 50,000 psi Minimum Yield Point to 4 in. Thick[4]

A 709 Specification for Structural Steel for Bridges[4]

B 454 Specification for Mechanically Deposited Coatings of Cadmium and Zinc on Ferrous Metals[8]

F 436 Specification for Hardened Steel Washers for Use with High-Strength Bolts[4]

2.2 *American National Standards:*[9]

ANSI B1.1 Unified Screw Threads

ANSI B18.2.1 Square and Hex Bolts and Screws

2.3 *Military Standard:*[10]

MIL-STD-105D Sampling Procedure and Tables for Inspection by Attributes

3. Ordering Information

3.1 Orders for products under this specification shall include the following:

3.1.1 Quantity (number of pieces of bolts and accessories),

3.1.2 Name of products, including accessories such as nuts and washers when desired,

3.1.3 Coating if required (that is, hot dip galvanized, or mechanical galvanized),

3.1.4 Dimensions including nominal bolt diameter and length. For bolts of dimensional requirements other than heavy hex structural bolts (see 1.4) it is normally necessary to specify grip length,

3.1.5 Type of bolt (that is, Type 1, 2 or 3). Note that Type 1 and 2 bolts may be shipped at the manufacturer's option if type has not been specified by the purchaser.

3.1.6 ASTM designation and date of issue, and

3.1.7 Any special requirements.

NOTE 3—Two examples of ordering descriptions follow: (*1*) 1000 pieces, heavy hex structural bolts, each with one hardened washer, ASTM F 436 and one heavy hex nut, ASTM 563 Grade C, hot dip galvanized, 1 by 4, ASTM A 325 dated ____. (*2*) 1000 pieces, heavy hex structural bolts, no nuts or washers, 7/8 by 2 1/4 Type 1, ASTM A 325 dated ____, for hot-dip galvanizing.

4. Materials and Manufacture

4.1 Steel for bolts shall be made by the open-hearth, basic-oxygen, or electric-furnace process.

4.2 Bolts shall be heat treated by quenching in a liquid medium from above the austenitizing temperature and then tempering by reheating to a temperature of at least 800°F.

4.3 Threads of bolts may be cut or rolled.

4.4 Unless otherwise specified, galvanized bolts shall be hot-dip zinc coated in accordance with the requirements for Class C of Specification A 153. When specified by the purchaser to be mechanically galvanized,

[5] *Annual Book of ASTM Standards*, Part 3.
[6] *Annual Book of ASTM Standards*, Part 1.
[7] *Annual Book of ASTM Standards*, Parts 1, 2, 3, 4, 5, and 10.
[8] *Annual Book of ASTM Standards*, Parts 4 and 9.
[9] May be obtained from American National Standards Institute, Inc., 1430 Broadway, New York, N.Y. 10018.
[10] Available from Naval Publications and Forms Center, 5801 Tabor Ave., Philadelphia, Pa. 19120.

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bolts shall be mechanically zinc coated and the coating and coated products shall conform to the requirements for Class 50 of Specification B 454, or to the coating thickness, adherence, and quality requirements for Class C of Specification A 153.

4.5 If heat treatment is performed by a subcontractor the heat-treated material shall be returned to the manufacturer for testing.

5. Chemical Requirements

5.1 Type 1 and 2 bolts shall conform to the requirements as to chemical composition prescribed in Table 1.

5.2 Type 3 bolts shall conform to one of the chemical compositions prescribed in Table 2. The selection of the chemical composition, A, B, C, D, E, or F, shall be at the option of the bolt manufacturer.

5.3 Product analyses may be made by the purchaser from finished material representing each lot of bolts. The chemical composition thus determined shall conform to the requirements prescribed in 4.1 or 4.2.

5.4 Application of heats of steel to which bismuth, selenium, tellurium, or lead has been intentionally added shall not be permitted for bolts.

6. Mechanical Requirements

6.1 Bolts shall not exceed the maximum hardness specified in Table 3. Bolts less than three diameters in length shall have hardness values not less than the minimum nor more than the maximum in hardness limits required in Table 3, as hardness is the only requirement.

6.2 Bolts 1¼ in. in diameter or less, other than those excepted in 6.1, shall be tested full size and shall conform to the tensile strength and either the proof load or alternative proof load requirements specified in Table 4.

6.3 Bolts larger than 1¼ in. in diameter, other than those excepted in 6.1, shall preferably be tested full size and when so tested shall conform to the tensile strength and either the proof load or alternative proof load requirements specified in Table 4. When equipment of sufficient capacity for full-size testing is not available, or when the length of the bolt makes full-size testing impractical, machined specimens shall be tested and shall conform to the requirements of Table 5. In the event that bolts are tested by both full-size and by the machined test specimen methods, the full-size test shall govern if a controversy between the two methods exists.

6.4 For bolts on which hardness and tension tests are performed, acceptance based on tensile requirements shall take precedence in the event that there is controversy over low readings of hardness tests.

6.5 In addition, when galvanized bolts and nuts are supplied, the bolt/nut assembly shall be tested full size in an assembled joint as specified in 8.5. After the tightening test, the assembly shall show no signs of failure.

6.6 When hot-dip galvanized Type 2 bolts are supplied, they shall be tension tested after galvanizing in accordance with 6.2 or 6.3 depending on the diameter. The number of tests from each lot shall be in accordance with 9.2.4 or 9.3.4.

7. Dimensions

7.1 Bolts with hex heads shall be full-body bolts conforming to the dimensions for heavy hex structural bolts specified in the American National Standard for Square and Hex Bolts and Screws (ANSI B18.2.1).

7.2 Threads shall be the Unified Coarse Thread Series as specified in the American National Standard for Unified Screw Threads (ANSI B1.1), and shall have Class 2A tolerances. When specified, 8 pitch thread series may be used on bolts over 1 in. in diameter.

7.3 Unless otherwise specified, bolts to be used with nuts or tapped holes which have been tapped oversize, in accordance with Specification A 563, shall have Class 2A threads before hot dip or mechanical galvanizing. After galvanizing, the maximum limit of pitch and major diameter may exceed the Class 2A limit by the following amount:

Diameter, in.[A]	Oversize Limit, in.[A]
Up to 7/16, incl	0.016
Over 7/16 to 1, incl	0.021
Over 1	0.031

[A] These values are the same as the minimum overtapping required for galvanized nuts in Specification A 563.

7.4 The gaging limit for bolts shall be verified during manufacture or use by assembly of a nut tapped as nearly as practical to the amount oversize shown above. In case of dispute, a calibrated thread ring gage of that

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same size (Class X tolerance, gage tolerance plus) is to be used. Assembly of the gage, or the nut described above, must be possible with hand effort following application of light machine oil to prevent galling and damage to the gage. These inspections, when performed to resolve disputes, are to be performed at the frequency and quality described in Table 6.

8. Test Methods

8.1 Tests shall be conducted in accordance with Supplement III of Methods and Definitions A 370.

8.2 For tension tests a proof load determination is preferred conducted in accordance with Method 1, Length Measurement, of Supplement III of Methods A 370.

8.3 Bolts tested in full size shall be tested in accordance with the wedge test method described in S11.1.5, Supplement III of Methods A 370. Fracture shall be in the body or threads of the bolt, without any fracture at the junction of the head and body.

8.4 The speed of testing as determined with a free-running cross head shall be a maximum of ⅛ in./min for the bolt proof-load determination, and a maximum of 1 in./min for the bolt tensile-strength determination.

8.5 The galvanized bolt shall be placed in a steel joint and assembled with a galvanized washer and a galvanized nut. The joint shall be one or more flat structural steel plates with a total thickness, including the washer, such that 3 to 5 full threads of the bolt are located between the bearing surfaces of the bolt head and nut. The hole in the joint shall have the same nominal diameter as the hole in the washer. The initial tightening of the nut shall produce a load in the bolt not less than 10 % of the specified proof load.[11] After initial tightening, the nut position shall be marked relative to the bolt, and the rotation shown in Table 8 shall be applied. During rotation, the bolt head shall be restrained from turning.

9. Quality Assurance of Mechanical Requirements

9.1 The manufacturer shall make sample inspections of every lot of bolts to ensure that properties of bolts are in conformance with the requirements of this specification. All bolts shall be inspection tested prior to shipment in accordance with one of the two quality assurance procedures described in 9.2 and 9.3, respectively. The manufacturer shall have the option of which procedure will be followed when furnishing bolts to any single purchase order.

9.1.1 The purpose of a lot inspection testing program is to ensure that each lot conforms to the requirements of this specification. For such a plan to be fully effective it is essential that following delivery the purchaser continue to maintain the identification and integrity of each lot until the product is installed in its service application.

9.2 *Production Lot Method:*

9.2.1 All bolts shall be processed in accordance with a lot identification-control quality assurance plan. The manufacturer shall identify and maintain the integrity of each production lot of bolts from raw-material selection through all processing operations and treatments to final packing and shipment. Each lot shall be assigned its own lot-identification number, each lot shall be tested, and the inspection test reports for each lot shall be retained.

9.2.2 A production lot, for purposes of assigning an identification number and from which test samples shall be selected, shall consist of all bolts processed essentially together through all operations to the shipping container that are of the same nominal size, the same nominal length, and produced from the same mill heat of steel.

9.2.3 The manufacturer shall make tests for proof load, tensile strength (wedge test), and hardness of each lot of bolts. Alternatively, in accordance with 6.3, tests may be tensile strength, yield strength, reduction of area, elongation, and hardness.

9.2.4 From each production lot, the minimum number of tests of each required property shall be as follows:

Number of Pieces in Production Lot	Number of Specimens
800 and less	1
801 to 8,000	2
8,001 to 35,000	3
35,001 to 150,000	8
150,001 and over	13

[11] Use of the torque value obtained in a Skidmore-Wilhelm or equivalent calibrator may be used in meeting this requirement.

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9.2.5 If any test specimen shows defective machining it may be discarded and another specimen substituted.

9.2.6 Bolts shall be packed in shipping containers as soon as practicable following final processing. Shipping containers shall be marked with the lot identification number.

9.2.7 A copy of the inspection test report for each production lot from which bolts are supplied to fill the requirements of a shipment shall be furnished to the purchaser when specified in the order. Individual heats of steel need not be identified on the test report.

9.3 *Shipping Lot Method:*

9.3.1 In-process inspection during all manufacturing operations and treatments and storage of manufactured bolts shall be in accordance with the practices of the individual manufacturer.

9.3.2 Before packing bolts for shipment, the manufacturer shall make tests of sample bolts taken at random from each shipping lot. A shipping lot, for purposes of selecting test samples, is defined as that quantity of bolts of the same nominal size and same nominal length necessary to fill the requirements of a single purchase order.

9.3.3 The manufacturer shall make tests for proof load, tensile strength (wedge test), and hardness of each lot of bolts. Alternatively, in accordance with 6.3, tests may be tensile strength, yield strength, reduction of area, elongation, and hardness.

9.3.4 From each shipping lot, the minimum number of tests of each required property shall be as follows:

Number of Pieces in Shipping Lot	Number of Specimens
150 and less	1
151 to 280	2
281 to 500	3
501 to 1,200	5
1,201 to 3,200	8
3,201 to 10,000	13
10,001 and over	20

9.3.5 If any test specimen shows defective machining it may be discarded and another specimen substituted.

9.3.6 A copy of the inspection test report for each shipping lot shall be furnished to the purchaser when specified in the order. Individual heats of steel are not identified in the finished product.

10. Marking

10.1 All bolts, Types 1, 2 and 3, shall be marked A 325 and shall also be marked with a symbol identifying the manufacturer.

10.2 In addition Type 1 bolts may, at the option of the manufacturer be marked with three radial lines 120 deg apart.

10.3 In addition Type 2 bolts shall be marked with three radial lines 60 deg apart.

10.4 In addition Type 3 bolts shall have the A 325 *underlined*, and the manufacturer may add other distinguishing marks indicating that the bolt is atmospheric corrosion resistant and of a weathering type.

10.5 All markings shall be located on the top of the bolt head and may be either raised or depressed, at the option of the manufacturer.

11. Visual Inspection for Head Bursts

11.1 A burst is an open break in the metal (material). Bursts can occur on the flats or corners of the heads of bolts.

11.2 A defective bolt, for the purposes of the visual inspection for bursts, shall be any bolt that contains a burst in the flat of the head which extends into the top crown surface of the head (chamfer circle) or the underhead bearing surface. In addition, bursts occurring at the intersection of two wrenching flats shall not reduce the width across corners below the specified minimum.

11.3 A lot, for the purposes of visual inspection, shall consist of all bolts of one type having the same nominal diameter and length offered for inspection at one time. No lot shall contain more than 10 000 pieces.

11.4 From each lot of bolts, a representative sample shall be picked at random and visually inspected for bursts. The sample size shall be as shown in Table 7. If the number of defective bolts found during inspection by the manufacturer is greater than the acceptance number given in Table 7 for the sample size, all bolts in the lot shall be visually inspected and all defective bolts shall be removed and destroyed. If the number of defective bolts found during inspection by the purchaser is greater than the acceptance number given in Table 7 for the sample size, the lot shall be subject to rejection.

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12. Inspection

12.1 If the inspection described in 12.2 is required by the purchaser, it shall be specified in the inquiry and contract or order.

12.2 The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works that concern the manufacture of the material ordered. The manufacturer shall afford the inspector all reasonable facilities to satisfy him that the material is being furnished in accordance with this specification. All tests (except product analysis) and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

13. Rejection

13.1 Unless otherwise specified, any rejection based on tests specified herein shall be reported to the manufacturer within 30 working days from the receipt of samples by the purchaser.

14. Certification

14.1 *Bolts*—When specified on the order the manufacturer shall furnish the test reports described in 9.2.7 or 9.3.6, depending on whether the bolts are furnished by the production lot or shipping lot method.

TABLE 1 Chemical Requirements for Types 1 and 2 Bolts

Element	Composition, %	
	Type 1 Bolts	Type 2 Bolts[A]
Carbon:		
Heat analysis	0.30 min	0.15–0.23
Product analysis	0.27 min	0.13–0.25
Manganese, min:		
Heat analysis	0.50	0.70
Product analysis	0.47	0.67
Phosphorus, max:		
Heat analysis	0.040	0.040
Product analysis	0.048	0.048
Sulfur, max:		
Heat analysis	0.050	0.050
Product analysis	0.058	0.058
Boron, min:		
Heat analysis	...	0.0005
Product analysis	...	0.0005

[A] Type 2 bolts shall be fully killed, fine grain steel.

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TABLE 2 Chemical Requirements for Type 3 Bolts

Element	Composition, %					
	Type 3 Bolts[4]					
	A	B	C	D	E	F
Carbon:						
Heat analysis	0.33–0.40	0.38–0.48	0.15–0.25	0.15–0.25	0.20–0.25	0.20–0.25
Product analysis	0.31–0.42	0.36–0.50	0.14–0.26	0.14–0.26	0.18–0.27	0.19–0.26
Manganese:						
Heat analysis	0.90–1.20	0.70–0.90	0.80–1.35	0.40–1.20	0.60–1.00	0.90–1.20
Product analysis	0.86–1.24	0.67–0.93	0.76–1.39	0.36–1.24	0.56–1.04	0.86–1.24
Phosphorus:						
Heat analysis	0.040 max	0.06–0.12	0.035 max	0.040 max	0.040 max	0.040 max
Product analysis	0.045 max	0.06–0.125	0.040 max	0.045 max	0.045 max	0.045 max
Sulfur:						
Heat analysis	0.050 max	0.050 max	0.040 max	0.050 max	0.040 max	0.040 max
Product analysis	0.055 max	0.055 max	0.045 max	0.055 max	0.045 max	0.045 max
Silicon:						
Heat analysis	0.15–0.30	0.30–0.50	0.15–0.30	0.25–0.50	0.15–0.30	0.15–0.30
Product analysis	0.13–0.32	0.25–0.55	0.13–0.32	0.20–0.55	0.13–0.32	0.13–0.32
Copper:						
Heat analysis	0.25–0.45	0.20–0.40	0.20–0.50	0.30–0.50	0.30–0.60	0.20–0.40
Product analysis	0.22–0.48	0.17–0.43	0.17–0.53	0.27–0.53	0.27–0.63	0.17–0.43
Nickel:						
Heat analysis	0.25–0.45	0.50–0.80	0.25–0.50	0.50–0.80	0.30–0.60	0.20–0.40
Product analysis	0.22–0.48	0.47–0.83	0.22–0.53	0.47–0.83	0.27–0.63	0.17–0.43
Chromium:						
Heat analysis	0.45–0.65	0.50–0.75	0.30–0.50	0.50–1.00	0.60–0.90	0.45–0.65
Product analysis	0.42–0.68	0.47–0.83	0.27–0.53	0.45–1.05	0.55–0.95	0.42–0.68
Vanadium:						
Heat analysis	...	...	0.020 min	...	...	...
Product analysis	...	...	0.010 min	...	...	...
Molybdenum:						
Heat analysis	...	0.06 max	...	0.10 max	...	...
Product analysis	...	0.07 max	...	0.11max	...	...
Titanium:						
Heat analysis	...	...	...	0.05 max	...	...
Product analysis	...	...	...	...	...	...

[4] A, B, C, D, E and F are classes of material used for Type 3 bolts. Selection of a class shall be at the option of the bolt manufacturer.

TABLE 3 Hardness Requirements for Bolts

Bolt Size, in.	Hardness Number			
	Brinell		Rockwell C	
	Min	Max	Min	Max
1/2 to 1, incl	248	331	24	35
1 1/8 to 1 1/2, incl	223	293	19	31

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TABLE 4 Tensile Requirements for Full Size Bolts

Bolt Size, Threads per Inch and Series Designation	Stress Area,[A] in.²	Tensile Strength[B] min, lbf	Proof Load,[B] Length Measurement Method	Alternative Proof Load,[B] Yield Strength Method, min
Column 1	Column 2	Column 3	Column 4	Column 5
½-13 UNC	0.142	17 050	12 050	13 050
⅝–11 UNC	0.226	27 100	19 200	20 800
¾–10 UNC	0.334	40 100	28 400	30 700
⅞–9 UNC	0.462	55 450	39 250	42 500
1–8 UNC	0.606	72 700	51 500	55 750
1⅛–7 UNC	0.763	80 100	56 450	61 800
1⅛–8 UN	0.790	82 950	58 450	64 000
1¼–7 UNC	0.969	101 700	71 700	78 500
1¼–8 UN	1.000	105 000	74 000	81 000
1⅜–6 UNC	1.155	121 300	85 450	93 550
1⅜–8 UN	1.233	129 500	91 250	99 870
1½–6 UNC	1.405	147 500	104 000	113 800
1½–8 UN	1.492	156 700	110 400	120 850

[A] The stress area is calculated as follows:

$$A_s = 0.7854\ [D - (0.9743/n)]^2$$

where:

A_s = stress area, in.²,
D = nominal bolt size, and
n = threads per inch.

[B] Loads tabulated are based on the following:

Bolt Size	Column 3	Column 4	Column 5
½, to 1 incl	120 000 psi	85 000 psi	92 000 psi
1⅛ to 1½, incl	105 000 psi	74 000 psi	81 000 psi

TABLE 5 Tensile Requirements for Specimens Machined from Bolts

Bolt Size, in.	Tensile Strength, min, psi	Yield Strength (0.2 % Offset) min, psi	Elongation in 2 in., min, %	Reduction of Area, min, %
1¼, 1⅜ and 1½	105 000	81 000	14	35

TABLE 6 Sample Sizes and Acceptance Numbers for Inspection of Hot Dip or Mechanically Galvanized Threads

Lot Size	Sample Size[A B]	Acceptance Number[A]
2 to 90	13	1
91 to 150	20	2
151 to 280	32	3
281 to 500	50	5
501 to 1 200	80	7
1 201 to 3 200	125	10
3 201 to 10 000	200	14
10 001 and over	315	21

[A] Sample sizes of acceptance numbers are extracted from "Single Sampling Plan for Normal Inspection" Table IIA, MIL-STD-105D.

[B] Inspect all bolts in the lot if the lot size is less than the sample size.

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TABLE 7 Sample Sizes and Acceptance Numbers for Inspection of Bursts

Lot Size	Sample Size[A, B]	Acceptance Number[A]
1 to 150	5	0
151 to 500	20	1
501 to 1 200	32	2
1 201 to 3 200	50	3
3 201 to 10 000	80	5

[A] Sample sizes and acceptance numbers are extracted from "Single Sampling Plan for Normal Inspection" Table 11A, MIL-STD-105D.

[B] Inspect all bolts in the lot if the lot size is less than the sample size.

TABLE 8 Test for Galvanized Bolts

Bolt Length Diameter, in.	Nominal Nut Rotation, deg (turn)
Up to and including 4	300 (5/6)
Over 4, but not exceeding 8	360 (1)
Over 8	420 ($1\frac{1}{16}$)

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